UVOIR SNe Ia SEDs & LCs

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with: Nick and Peter

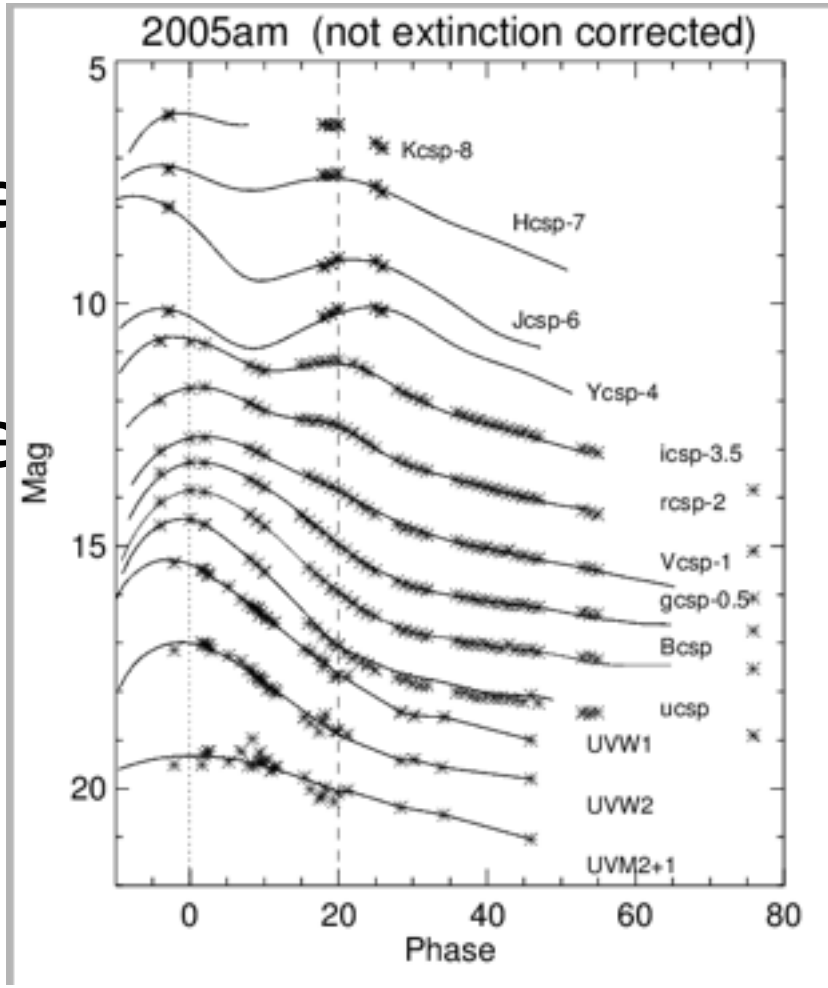
Data

Spectra:

- UV: Swift, 11fe, template
- Optical: CSP & public
- NIR: Marion and template

Photometry:

- UV: Swift
- Optical & NIR: CSP



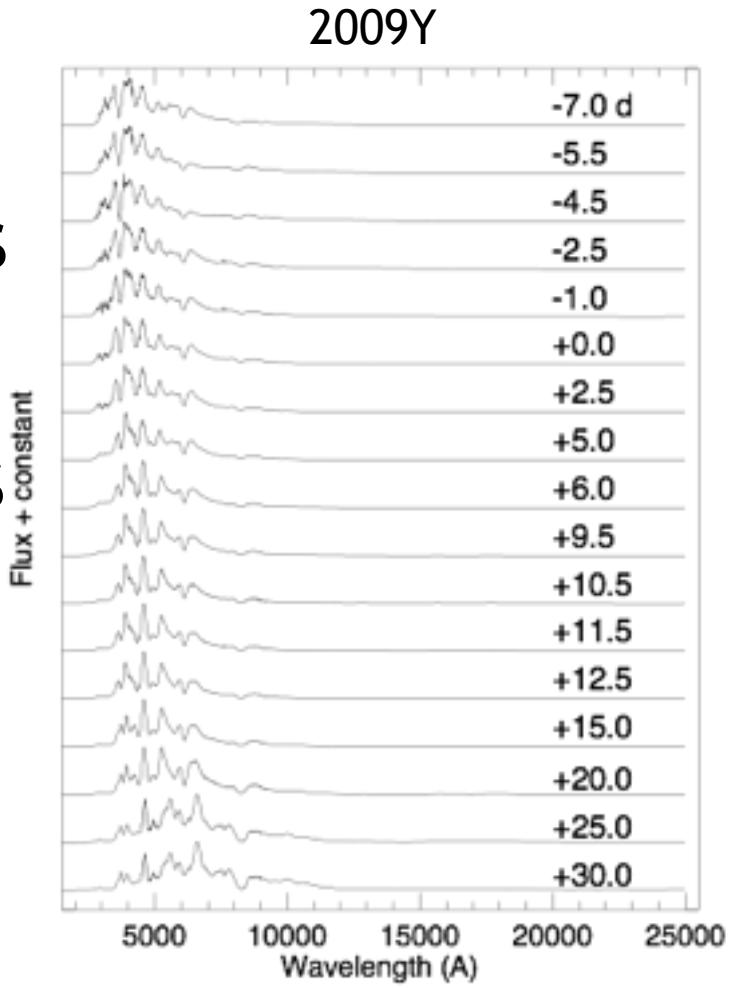
Data

Spectra:

- UV: Swift, 11fe, templates
- Optical: CSP & public
- NIR: Marion and templates

Photometry:

- UV: Swift
- Optical & NIR: CSP



Extinction and Distances

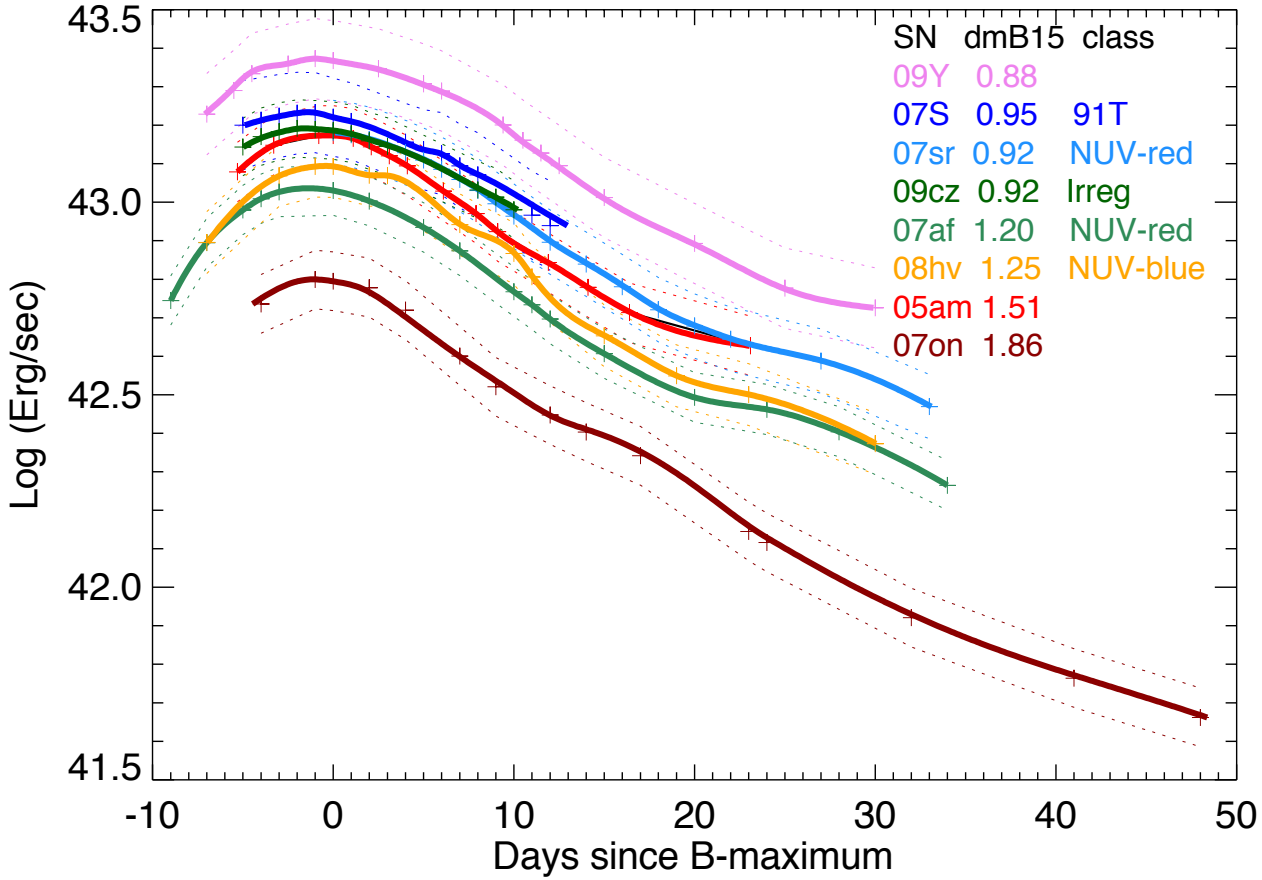
Host E(B-V) and Rv from Burns+2014 & SNooPy

- Applied to SEDs (not LCs)

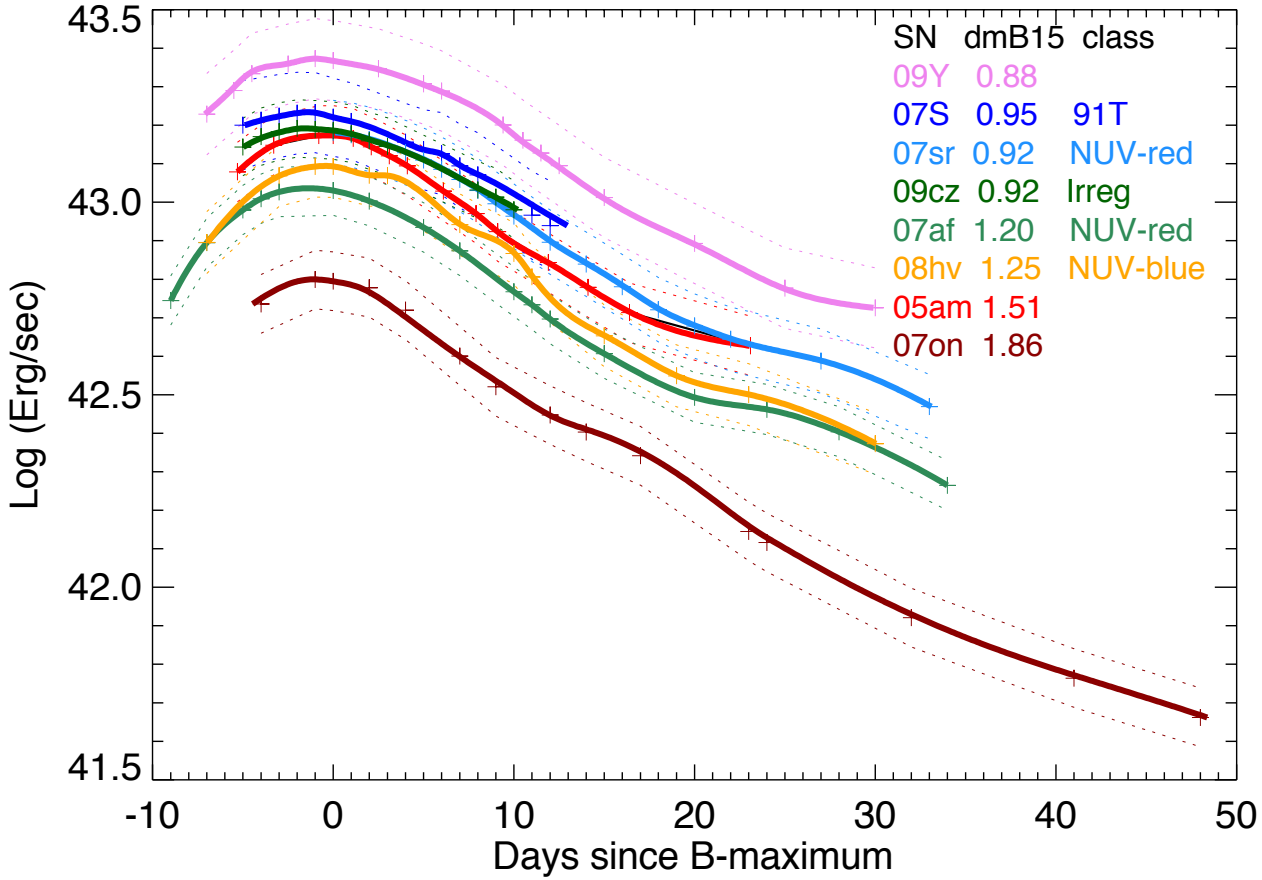
Fitzpatrick extinction law

Ce

SN	$E(B-V)_{MW}$ (mag)	$E(B-V)_{Host}$ (mag)	R_{V_Host}	Distance Modulus (mag)
2005am	0.054(0.002)	0.053(0.017)	2.7(1.0)	32.85(0.23)
2007S	0.022(0.002)	0.478(0.026)	2.0(0.2)	33.98(0.19)
2007af	0.034(0.001)	0.178(0.024)	2.0(0.6)	31.72(0.07)
2007on	0.010(0.001)	0.003(0.001)	2.7(1.2)	31.45(0.19)
2007sr	0.199(0.001)	0.199(0.007)	2.0(0.8)	31.66(0.08)
2008hv	0.028(0.001)	0.074(0.023)	1.7(1.2)	33.76(0.16)
2009Y	0.102(0.002)	0.270(0.012)	2.0(0.6)	33.11(0.16)
2009cz	0.026(0.001)	0.091(0.011)	3.1(0.7)	34.82(0.16)

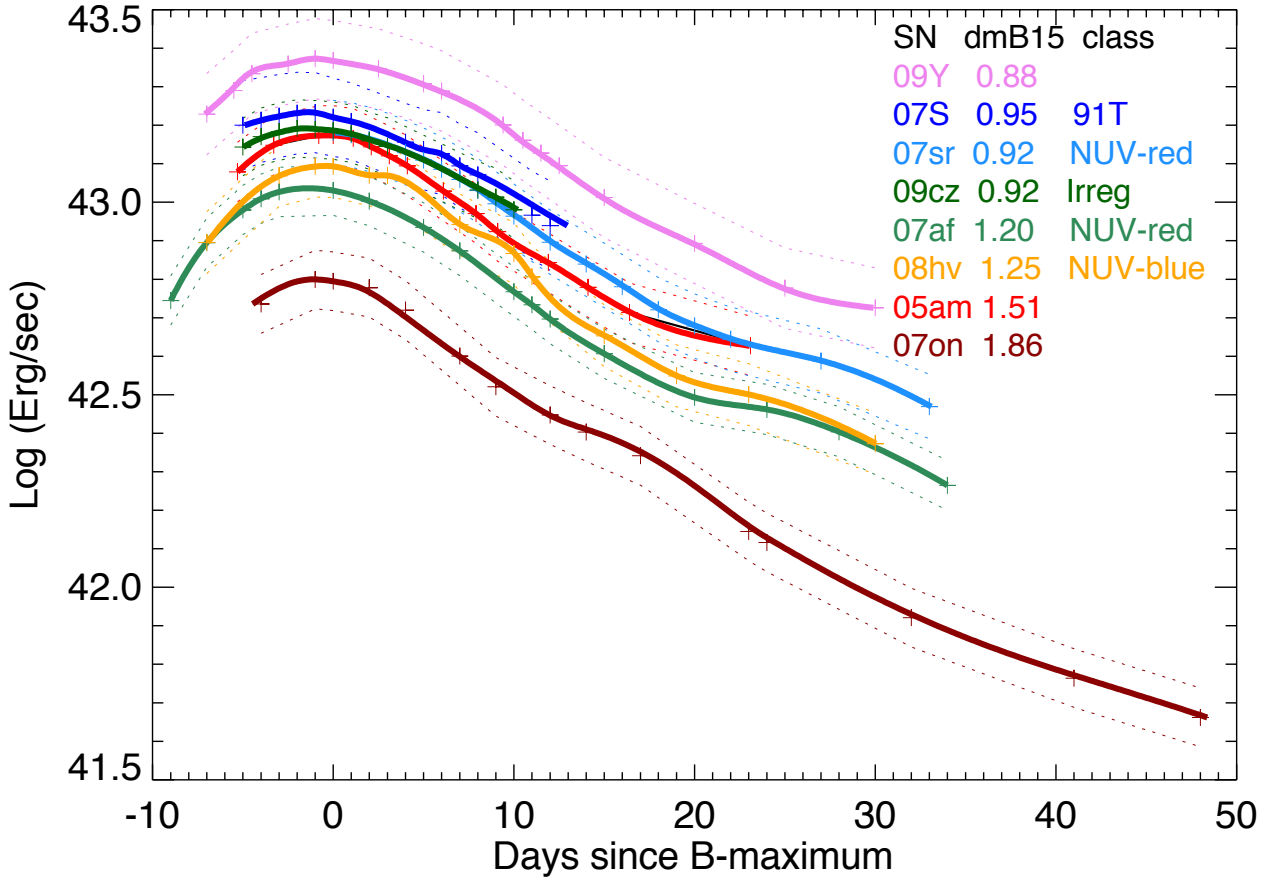


SN	$\Delta m_{15}(B)$ (mag)	$JD\ B_{Max}$ (+2450000)	$JD\ Bolo_{Max}$ (+2450000)	Peak Luminosity ($\frac{erg}{sec}$)	^{56}Ni Mass ($M_\odot$)
2005am	1.51	3436.6	3436.3	$1.49(24) \times 10^{43}$	0.61(10)
2007S	0.95	4144.7	4143.3	$1.71(35) \times 10^{43}$	0.89(18)
2007af	1.20	4174.7	4173.4	$1.08(15) \times 10^{43}$	0.47(07)
2007on	1.86	4420.2	4419.1	$0.63(10) \times 10^{43}$	0.24(04)
2007sr	0.92	4449.4	4449.4	$1.51(27) \times 10^{43}$	0.68(12)
2008hv	1.25	4816.8	4816.3	$1.24(21) \times 10^{43}$	0.55(09)
2009Y	0.88	4876.4	4875.5	$2.35(50) \times 10^{43}$	1.14(24)
2009cz	0.92	4943.5	4941.9	$1.55(24) \times 10^{43}$	0.67(10)



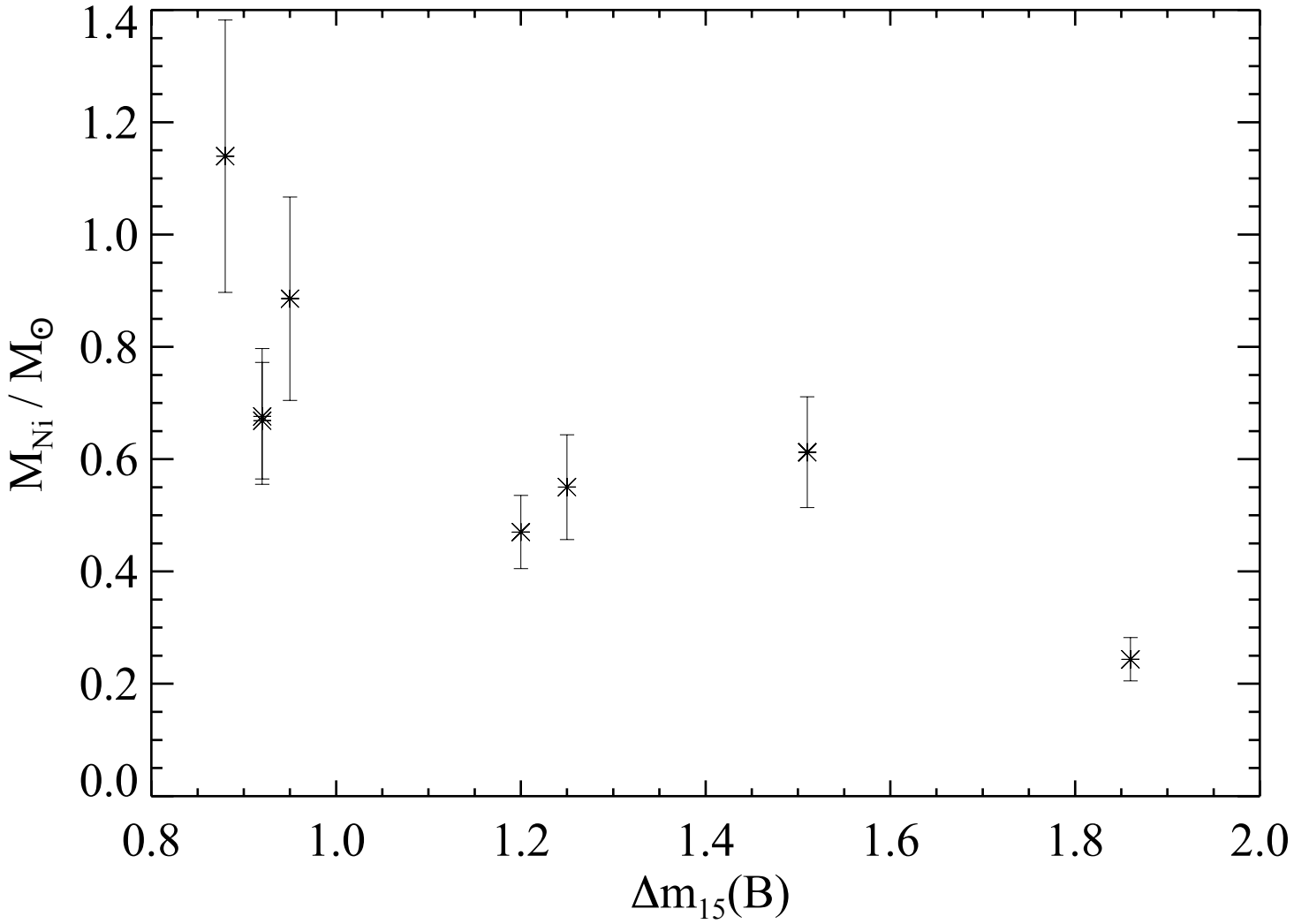
Error Sources

SN	Photometric (mag)	MW Extinction (mag)	Host Extinction (mag)	Distance (mag)	Total (mag)
2005am	0.02	0.01	0.09	0.23	0.19
2007S	0.03	0.01	0.16	0.18	0.25
2007af	0.01	0.01	0.14	0.07	0.16
2007on	0.01	0.01	0.01	0.19	0.19
2007sr	0.01	0.03	0.19	0.08	0.21
2008hv	0.02	0.01	0.12	0.15	0.20
2009Y	0.01	0.02	0.20	0.15	0.26
2009cz	0.02	0.01	0.09	0.15	0.19



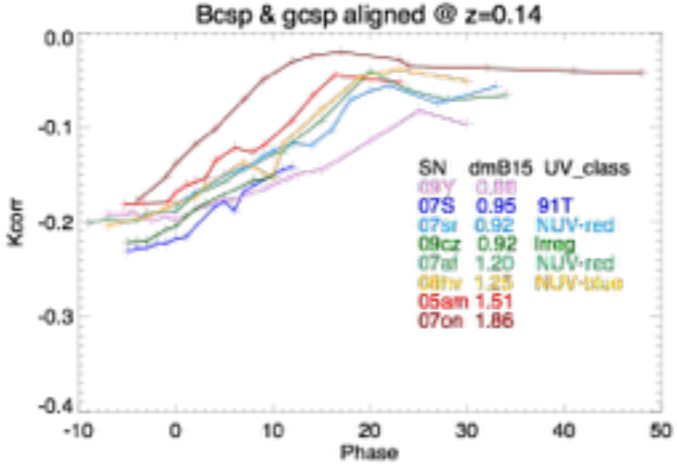
Arnett

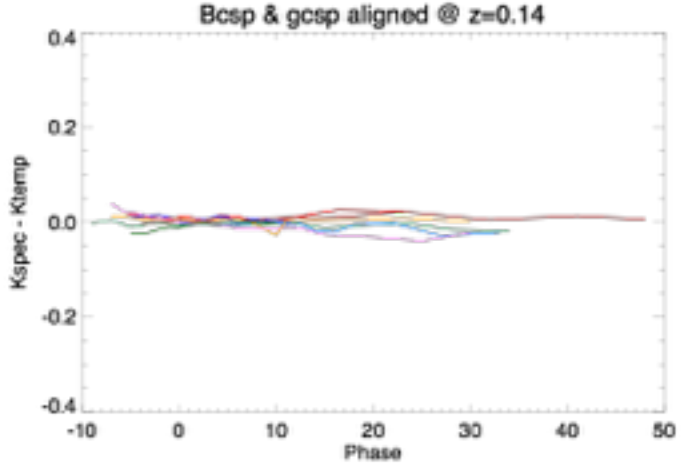
Others?

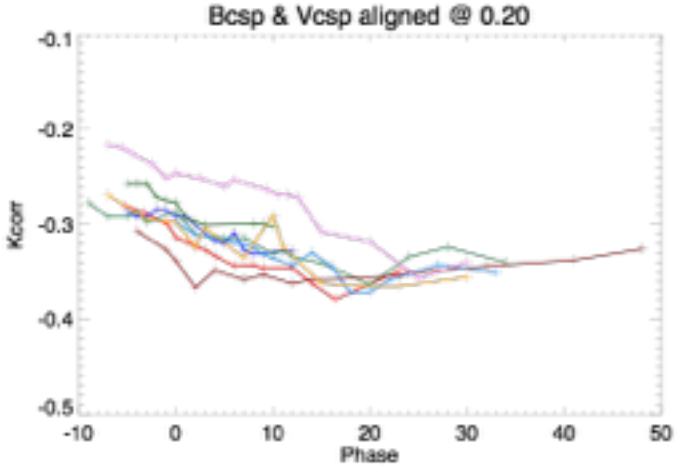

1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
M_{Ni} / $M_\odot$
0.8
1.0
1.2
1.4
1.6
1.8
2.0
Δm_{15}(B)

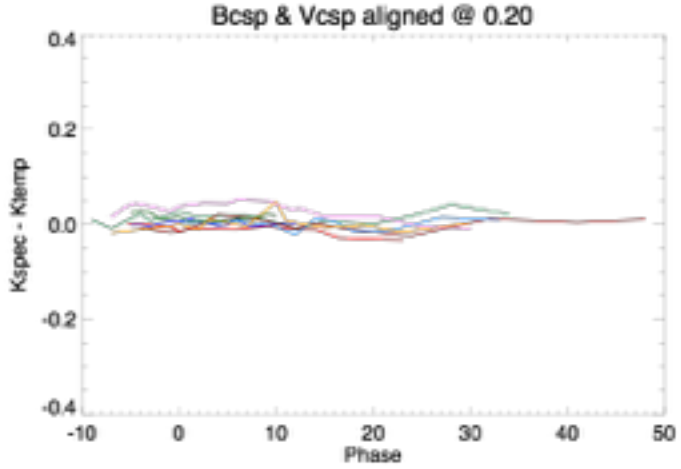
K-Corrections

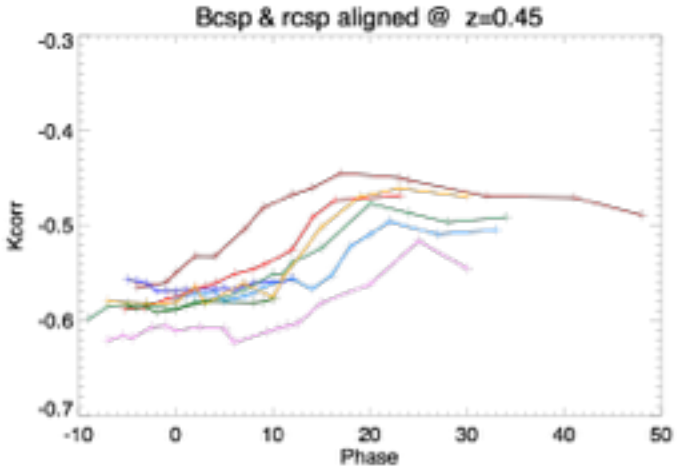
SNooPy

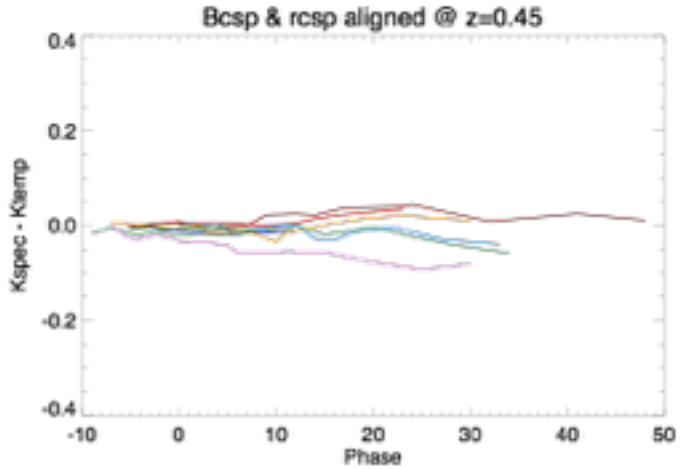

Bcsp & gcsp aligned @ z=0.14
Kcorr
Phase
SN dmB15 UV_class
07S 0.95 91T
07sr 0.92 NUV-red
09cz 0.92 Irreg
07af 1.20 NUV-red
08hv 1.25 NUV-blue
05am 1.51
07on 1.86

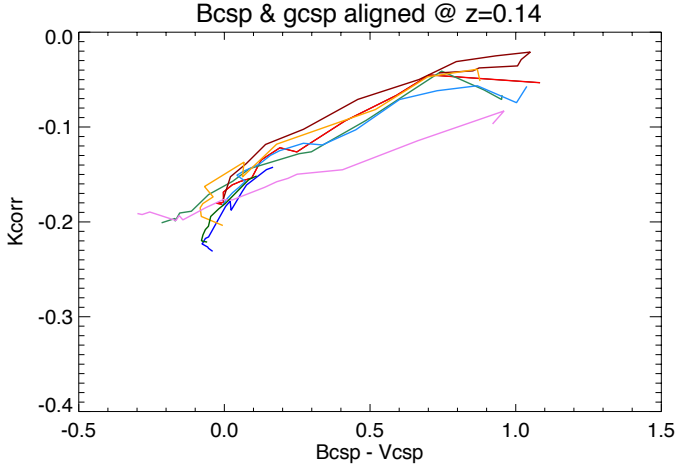

Bcsp & gcsp aligned @ z=0.14
Kspec - Ktemp
Phase


Bcsp & Vcsp aligned @ 0.20
Kcorr
Phase


Bcsp & Vcsp aligned @ 0.20
Kspec - Ktemp
Phase


Bcsp & rcsp aligned @ z=0.45
Kcorr
Phase


Bcsp & rcsp aligned @ z=0.45
Kspec - Ktemp
Phase


Bcsp & gcsp aligned @ z=0.14
Kcorr
Bcsp - Vcsp
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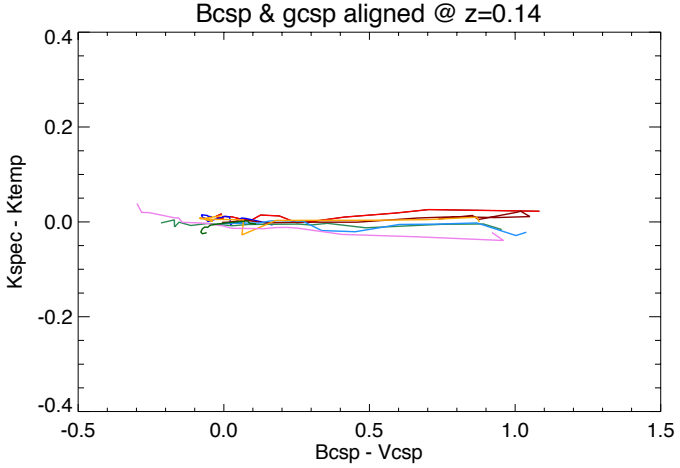
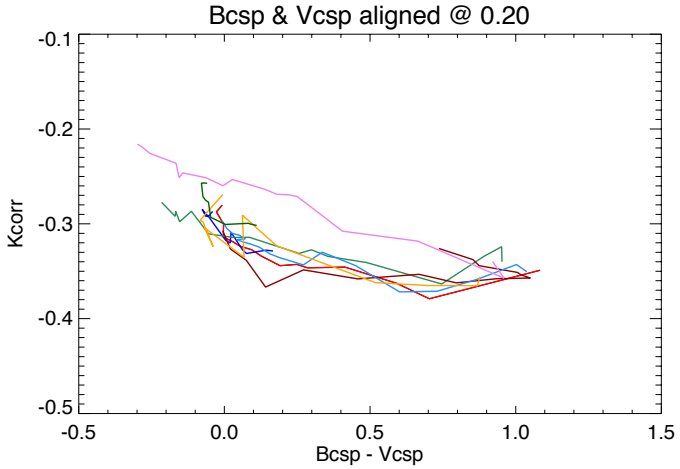
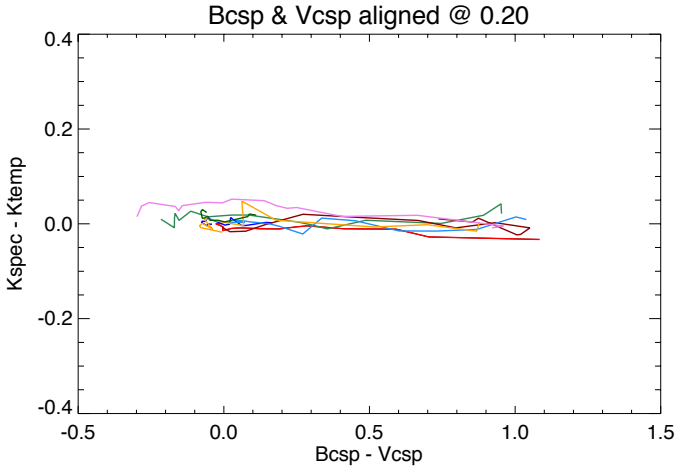
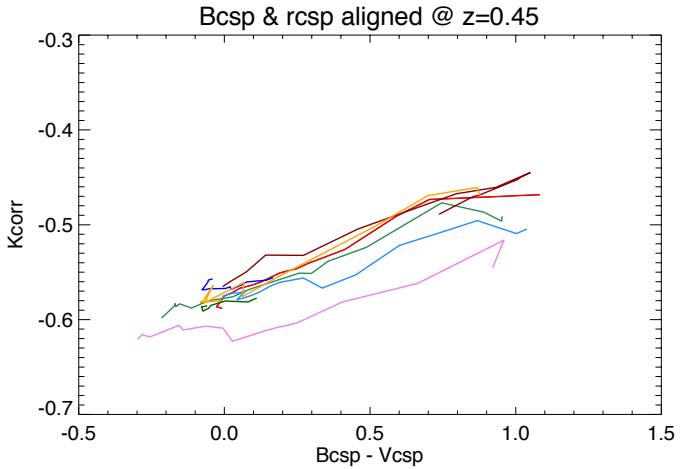
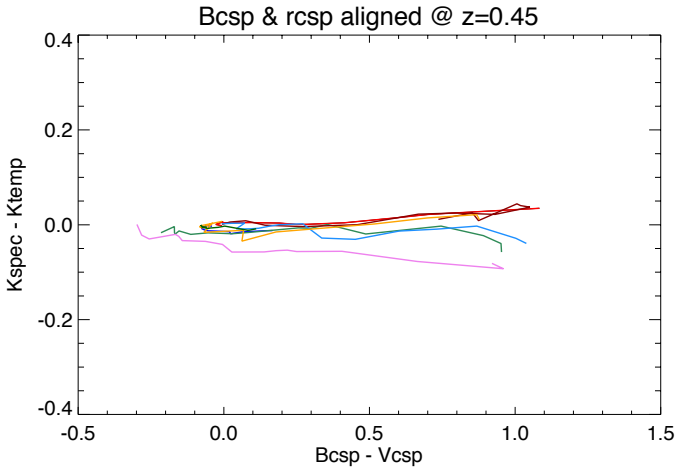
-0.1
-0.2
-0.3
-0.4
-0.5
0.0
0.5
1.0
1.5

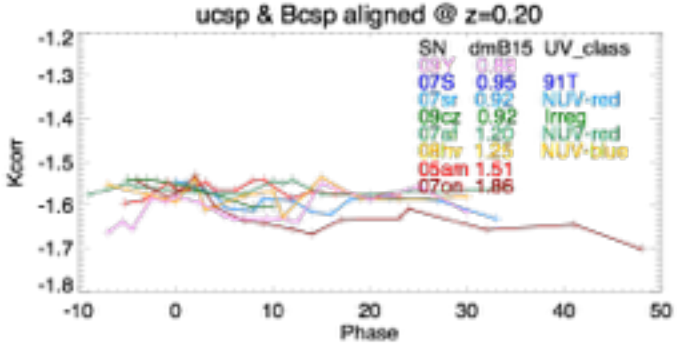

Bcsp & gcsp aligned @ z=0.14
Kspec - Ktemp
Bcsp - Vcsp
0.4
0.2
0.0
-0.2
-0.4
-0.5
0.0
0.5
1.0
1.5

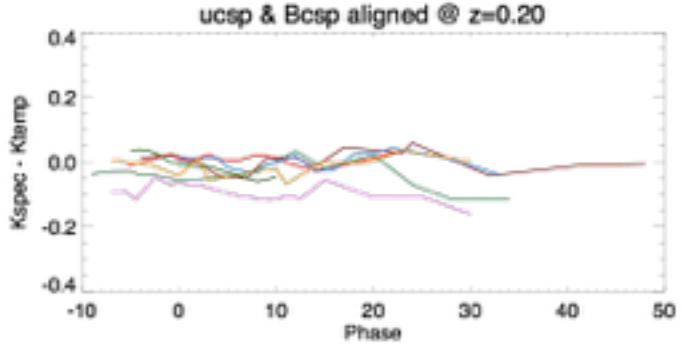

Bcsp & Vcsp aligned @ 0.20
Kcorr
Bcsp - Vcsp
-0.1
-0.2
-0.3
-0.4
-0.5
0.0
0.5
1.0
1.5

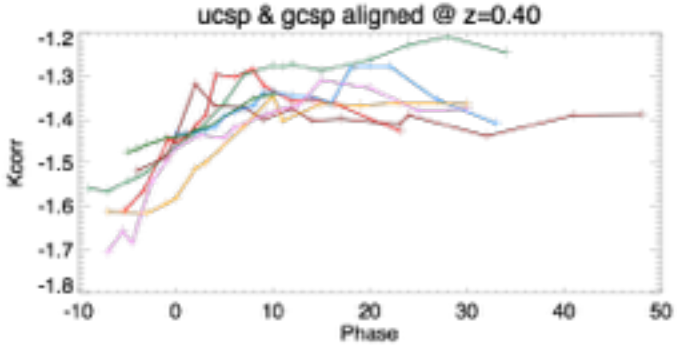

Bcsp & Vcsp aligned @ 0.20
Kspec - Ktemp
Bcsp - Vcsp
0.4
0.2
0.0
-0.2
-0.4
-0.5
0.0
0.5
1.0
1.5

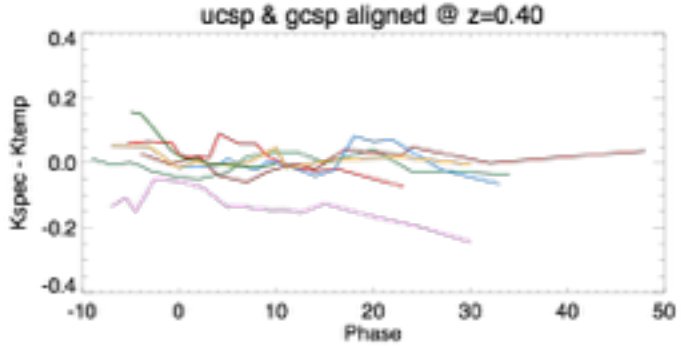

Bcsp & rcsp aligned @ z=0.45
Kcorr
Bcsp - Vcsp
-0.3
-0.4
-0.5
-0.6
-0.7
-0.5
0.0
0.5
1.0
1.5

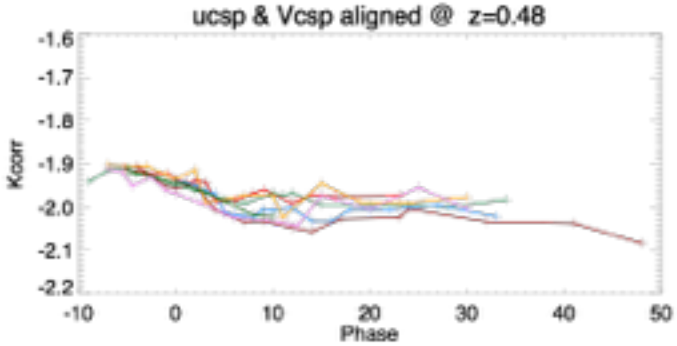

Bcsp & rcsp aligned @ z=0.45
Kspec - Ktemp
Bcsp - Vcsp
0.4
0.2
0.0
-0.2
-0.4
-0.5
0.0
0.5
1.0
1.5


ucsp & Bcsp aligned @ z=0.20
SN dmB15 UV_class
07S 0.95 91T
07sr 0.92 NUV-red
09cz 0.92 Irreg
07al 1.20 NUV-red
08hv 1.25 NUV-blue
05am 1.51
07on 1.86
Kcorr
Phase


ucsp & Bcsp aligned @ z=0.20
Kspec - Ktemp
Phase


ucsp & gcsp aligned @ z=0.40
Kcorr
Phase


ucsp & gcsp aligned @ z=0.40
Kspec - Ktemp
Phase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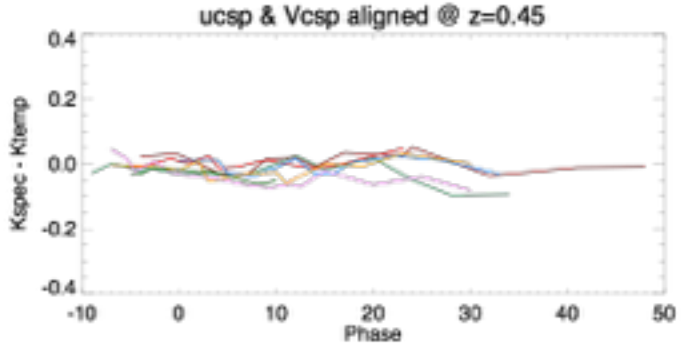
Kcorr
Phase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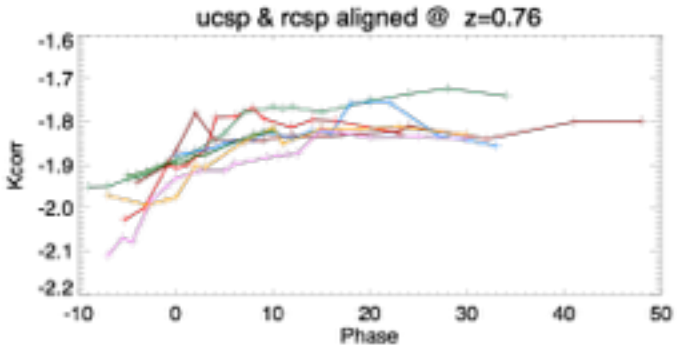
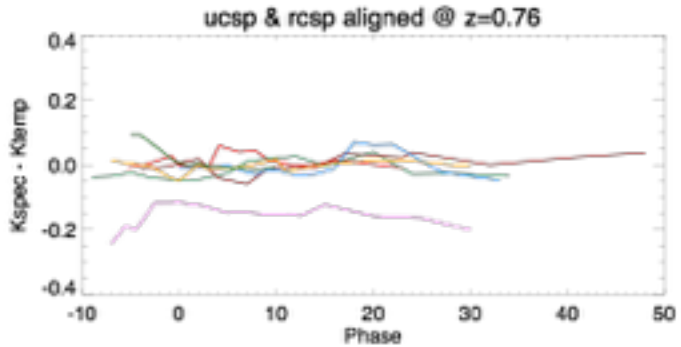
Kspec - Ktemp
Phase


ucsp & rcsp aligned @ z=0.76
Kcorr
Phase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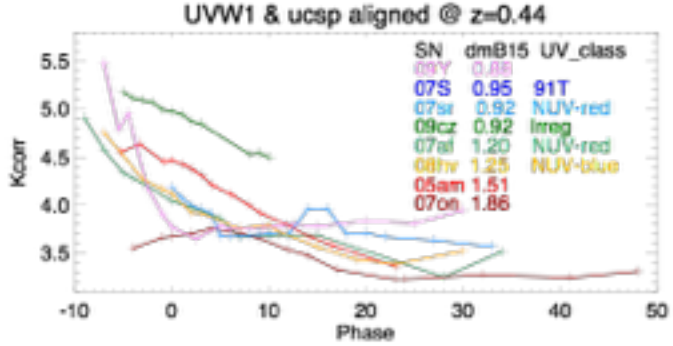
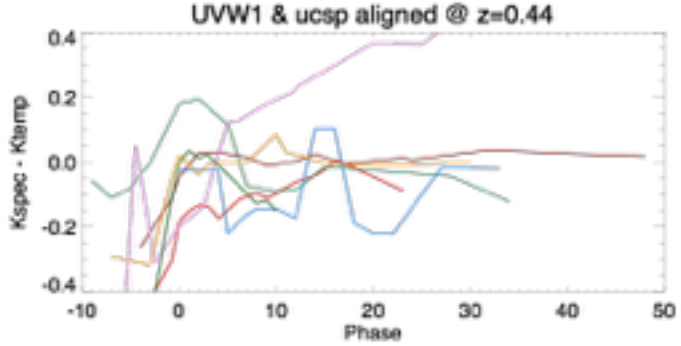
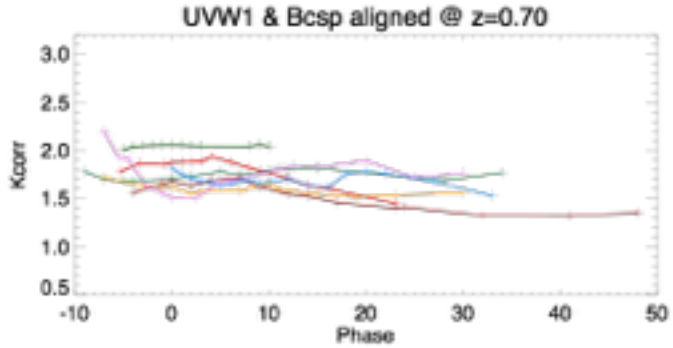
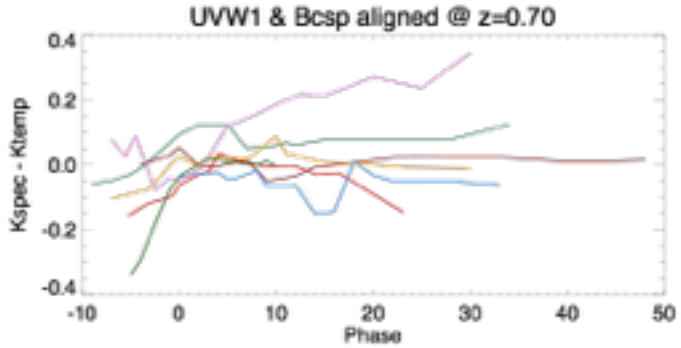
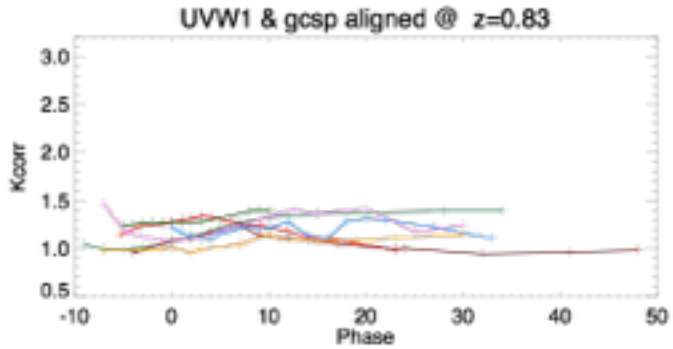
Kspec - Ktemp
Phase

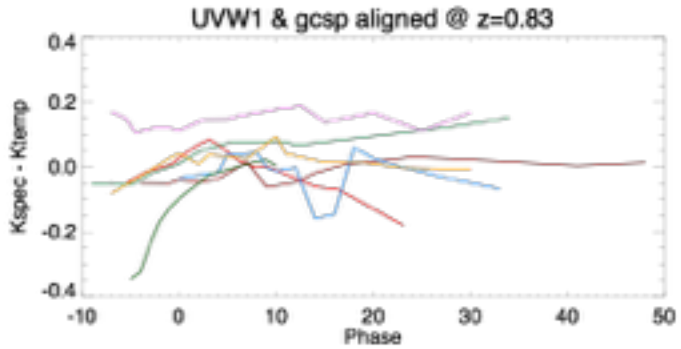

UVW1 & ucsp aligned @ z=0.44
SN dmB15 UV_class
07S 0.95 91T
07sr 0.92 NUV-red
09cz 0.92 Ireg
07al 1.20 NUV-red
08hv 1.25 NUV-blue
05am 1.51
07on 1.86
Kcorr
Phase

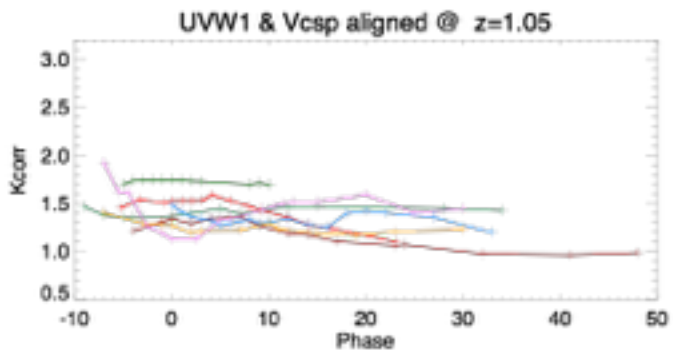

UVW1 & ucsp aligned @ z=0.44
Kspec - Ktemp
Phase

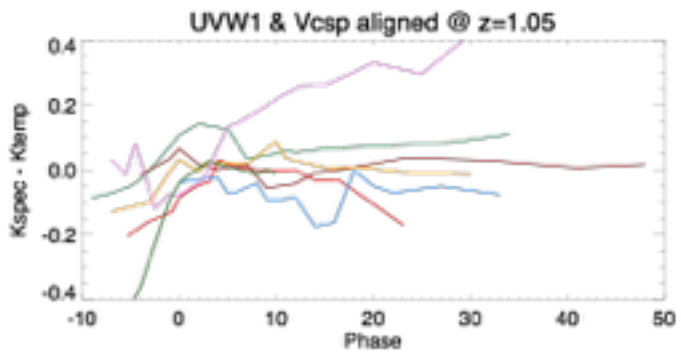

UVW1 & Bcsp aligned @ z=0.70
Kcorr
Phase

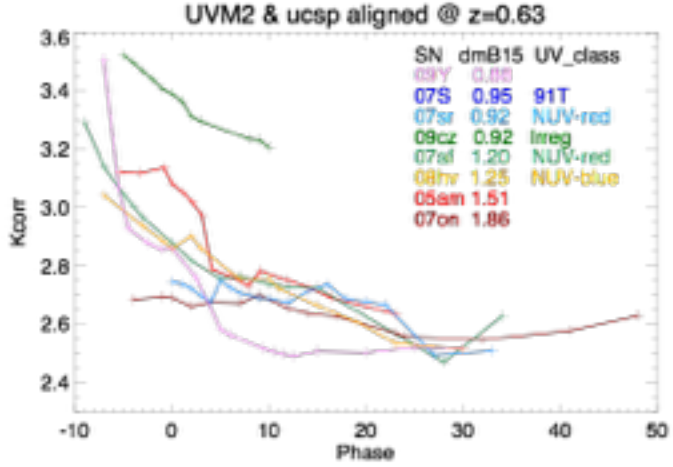

UVW1 & Bcsp aligned @ z=0.70
Kspec - Ktemp
Phase

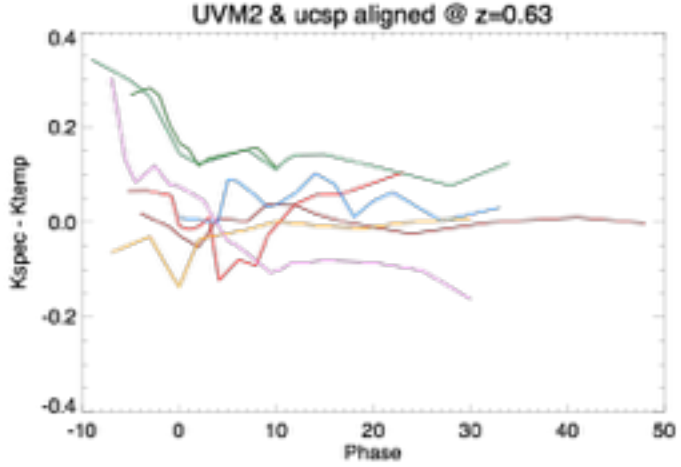

UVW1 & gcsp aligned @ z=0.83
Kcorr
Phase

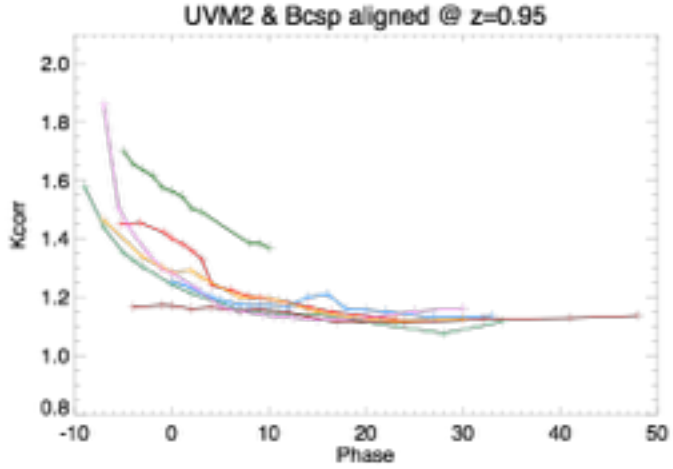

UVW1 & gcsp aligned @ z=0.83
Kspec - Ktemp
Phase

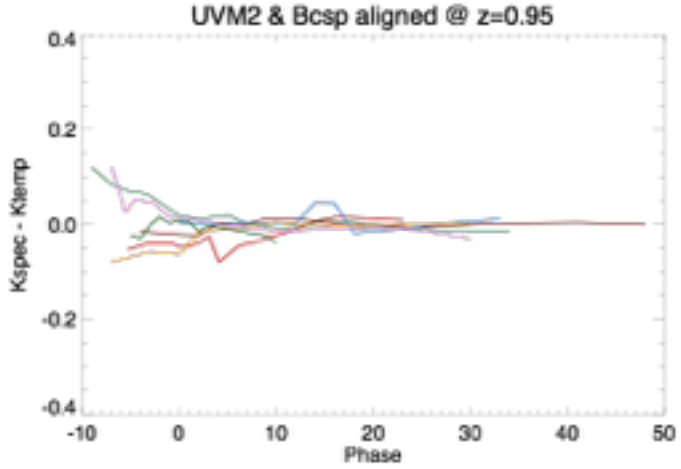

UVW1 & Vcsp aligned @ z=1.05
Kcorr
Phase

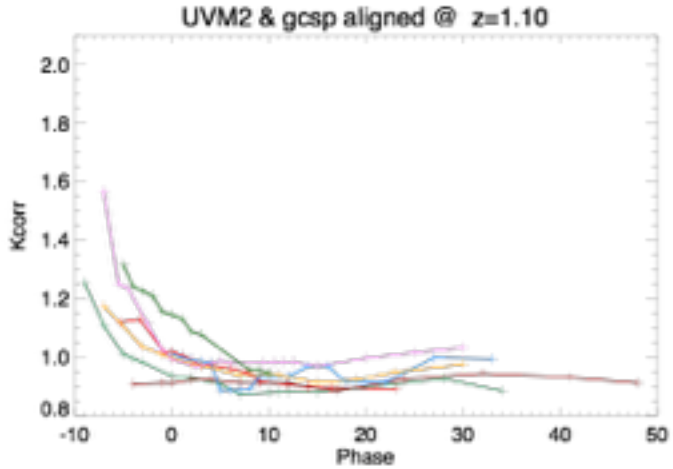

UVW1 & Vcsp aligned @ z=1.05
Kspec - Ktemp
Phase

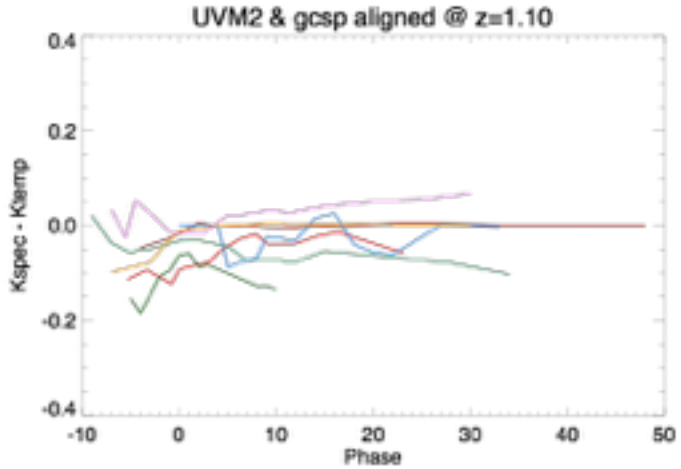

UVM2 & ucsp aligned @ z=0.63
SN dmB15 UV_class
09Y 0.88
07S 0.95 91T
07sr 0.92 NUV-red
09cz 0.92 Ireg
07af 1.20 NUV-red
08hv 1.25 NUV-blue
05am 1.51
07on 1.86
Kcorr
Phase


UVM2 & ucsp aligned @ z=0.63
Kspec - Ktemp
Phase


UVM2 & Bcsp aligned @ z=0.95
Kcorr
Phase


UVM2 & Bcsp aligned @ z=0.95
Kspec - Ktemp
Phase


UVM2 & gcsp aligned @ z=1.10
Kcorr
Phase


UVM2 & gcsp aligned @ z=1.10
Kspec - Ktemp
Phase

Other fun stuff

1999aa-like (91T-like) UV phot & spectra series

- Very blue prior to -5 days
- Bright feature at 3000A at -9 days
- Models suggest doubly ionized Fe group ions above the photosphere

How to decontaminate Swift UVOT grism data